

DSM2 EXTENSION:

An Unorthodox Approach

Ines C. Ferreira
BDO

Motivation:

- Need for a relatively fast model that can be used when conditions at Martinez are likely to change significantly.

Tools:

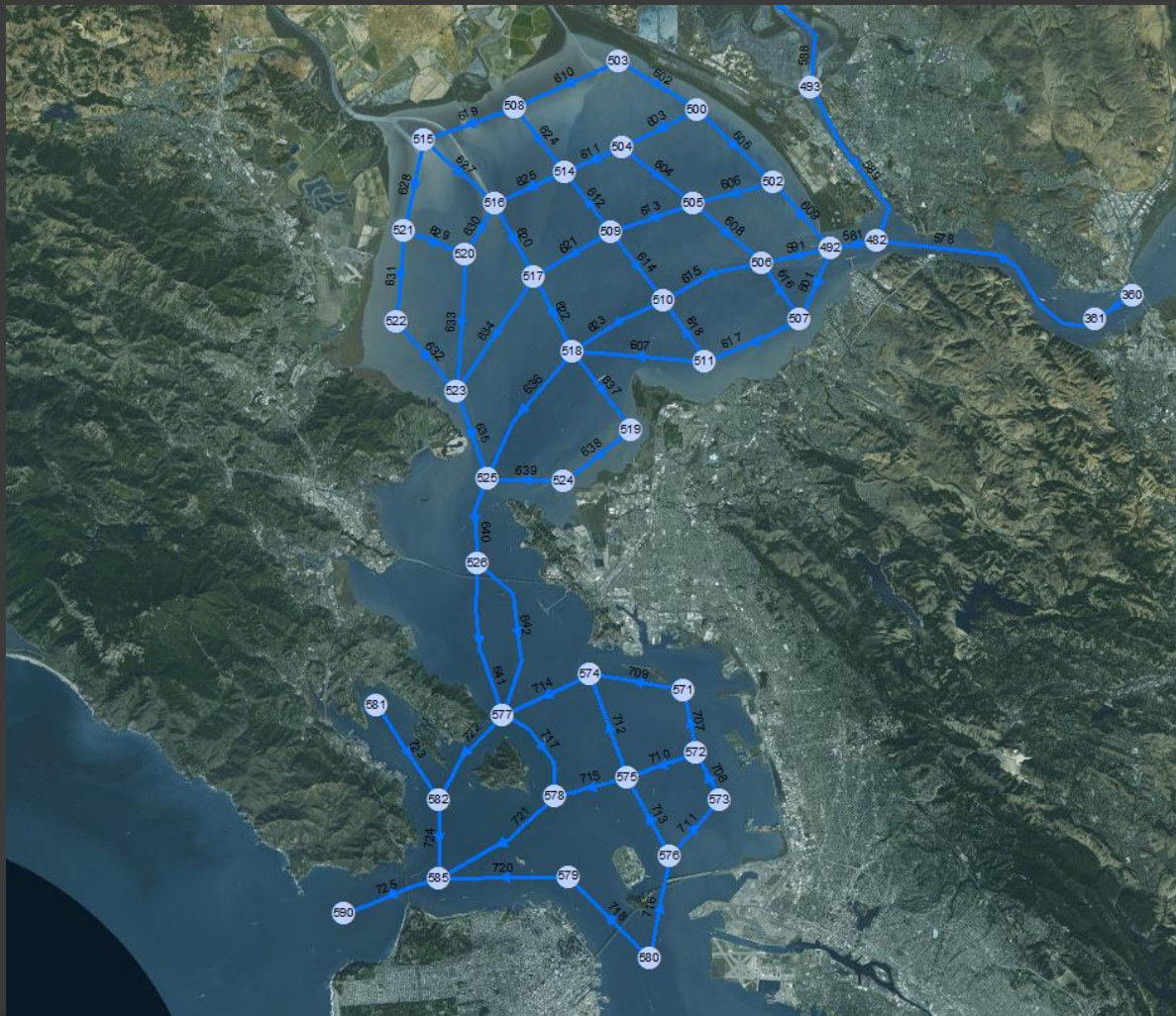
⦿ GIS

- ArcMap, geoprocessing tools and Lidar data

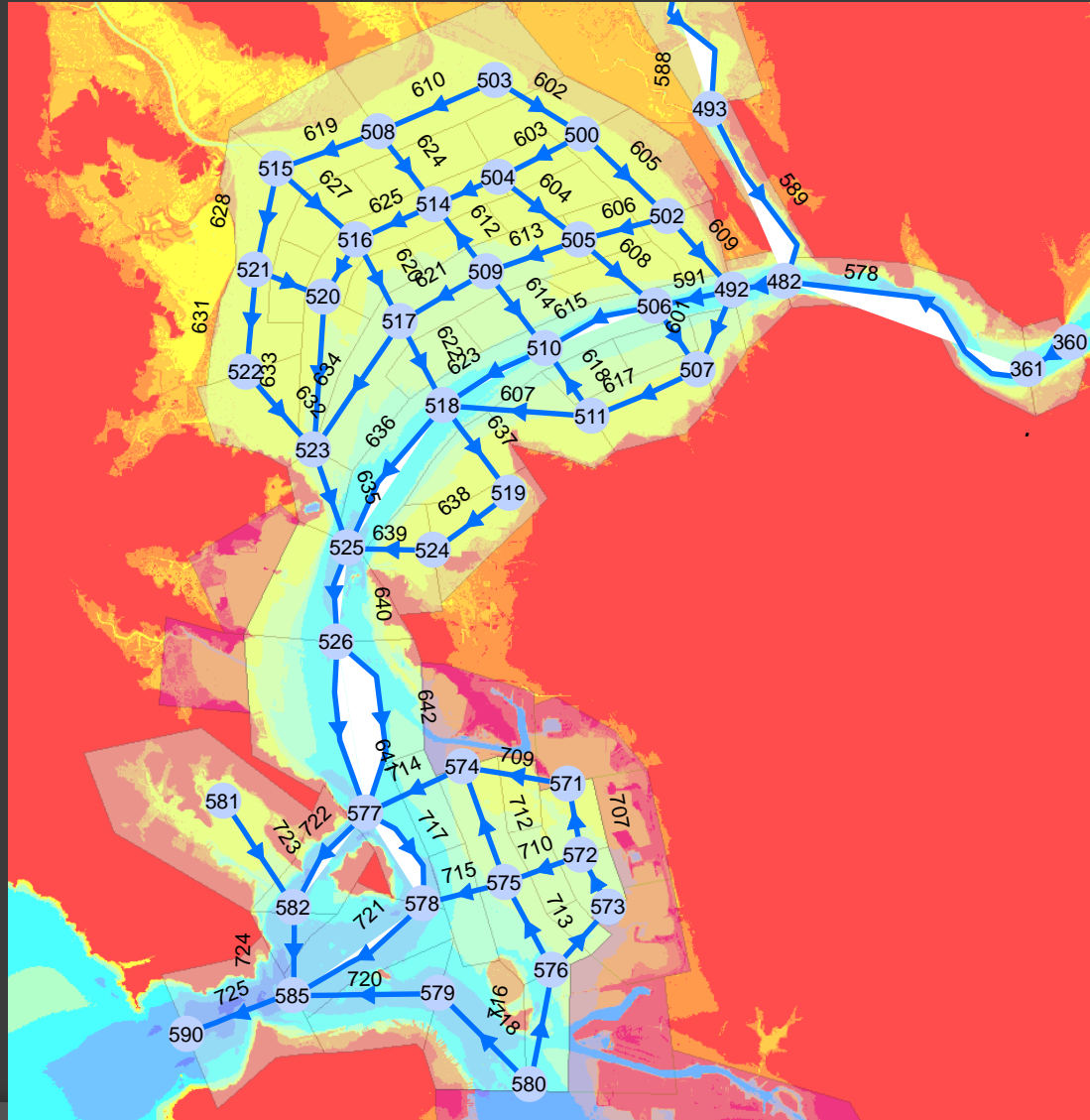
⦿ PEST

- Calibration software

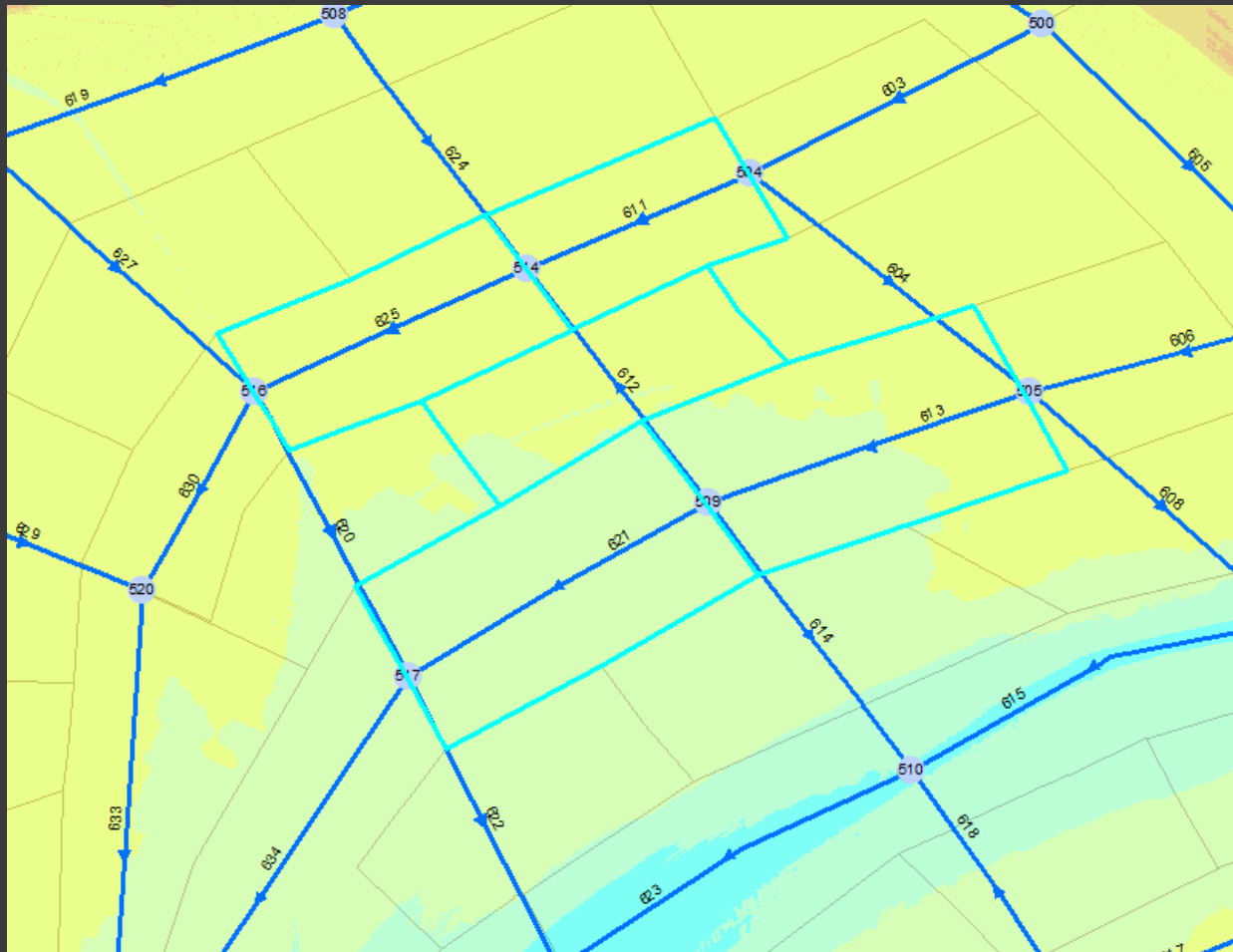
The Extended Grid Network



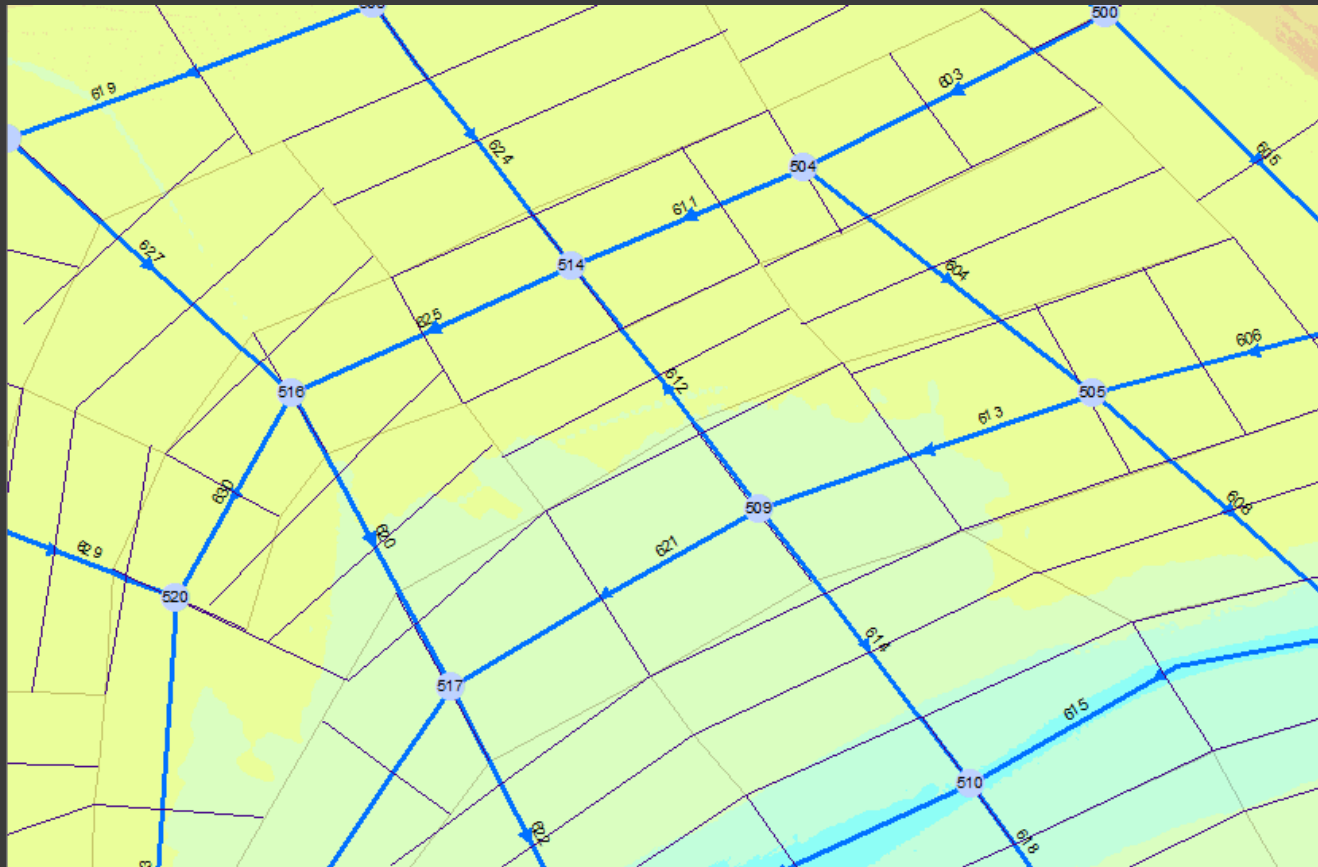
The Extended Grid Network



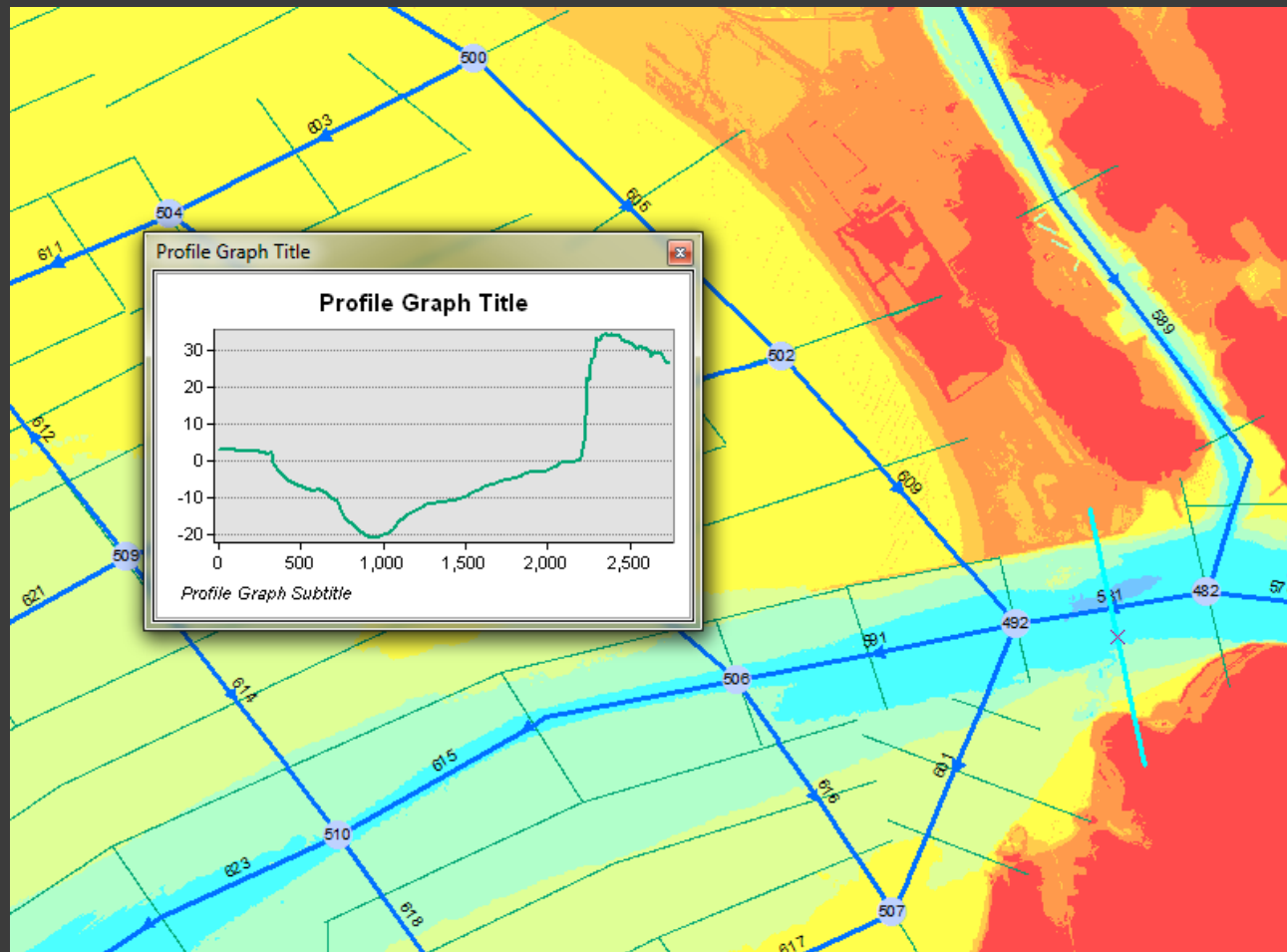
Top Areas and Volumes



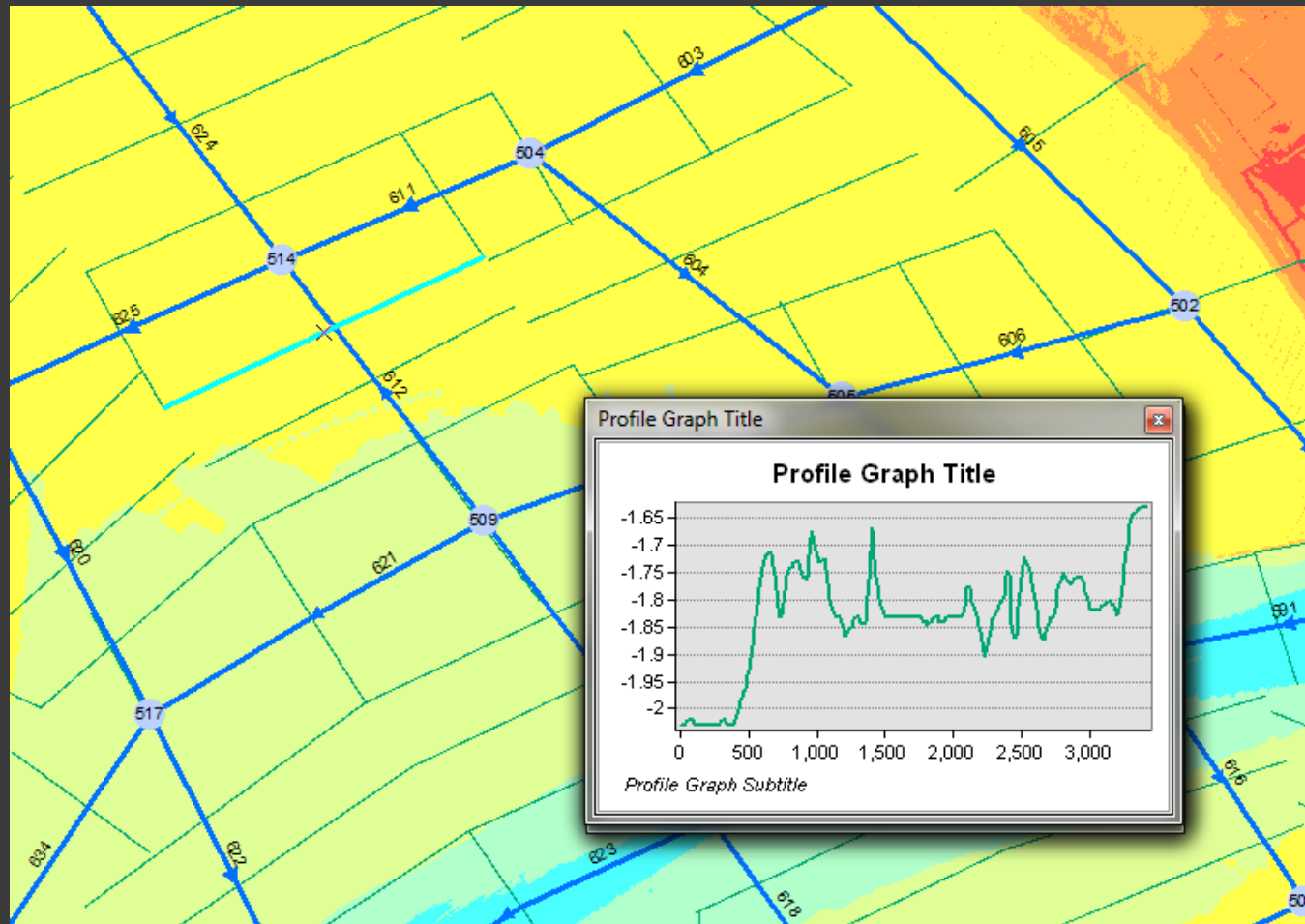
Cross-Sections



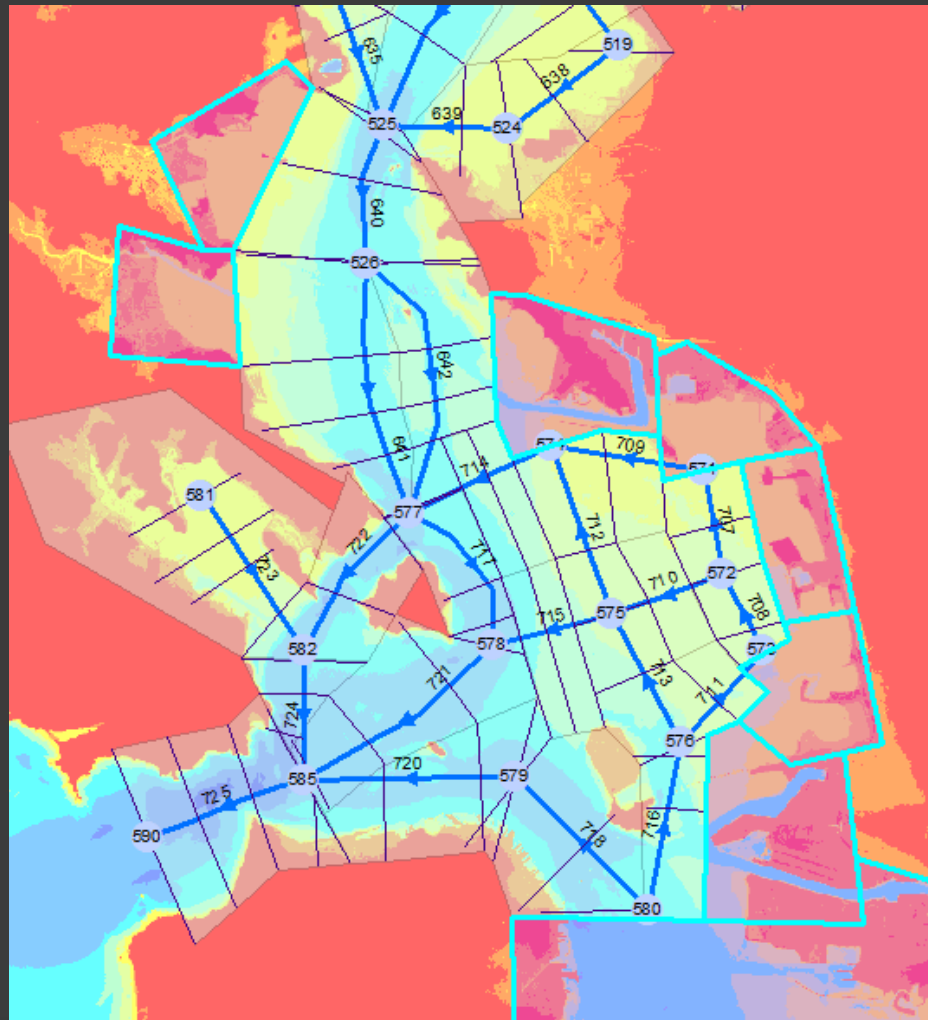
3D Cross-Section



3D Cross-Section



Reservoirs



Geoprocessing steps

- ④ Compute x-sections
- ④ Compute volumes under each channel top areas
- ④ Compute reservoir volumes

Additional Computations

- ⦿ Use Nicky's xsection_calculator script
- ⦿ Compute volumes as in DSM2
- ⦿ Adjust channel lengths so DSM2 volumes match GIS volumes
- ⦿ Compute reservoir area and bottom elevation

Calibration

- Use PEST



RESERVOIR CONNECTION

This table lists reservoir connections to neighboring nodes. Flow through reservoir connections is calculated using the following formula

$$Q = C_{to} \sqrt{2g(z_{node} - z_{res})} \dots z_{res} < z_{node}$$

$$Q = C_{from} \sqrt{2g(z_{res} - z_{node})} \dots z_{res} > z_{node}$$

Where:

- C_{to} and C_{from} are coefficients representing the hydraulic efficiency of the reservoir connection and the nominal Area perpendicular to flow.
- g is gravity and
- z_{res} and z_{node} are the water surface elevations at the reservoir and node (node surface is assessed by means of a reference channel that has no reservoirs attached to it).